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**UUNET – BELL ATLANTIC**

**CO-Based Remote Access**

**Statement of Work**

**May 30, 1998**

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## I. Introduction

UUNET's Dial Access Division has invested time and money to develop CO-Based Remote Access (COBRA), a confidential and proprietary approach to building dial Internet infrastructure. UUNET requires the Services of Contractor in order to implement its approach.

UUNET's classical Internet dial access architecture consisted of PRI's which were backhauled into a NAS located in a UUNET hub, where the traffic was aggregated and routed onto UUNET's Internet backbone. Since the COBRA architecture moves the NAS out to the CO, the traffic is then aggregated at the CO. Realizing a 6:1 concentration ratio, COBRA requires only one egress frame T1 backhaul for each six ingress PRI's in the NAS, a significant departure from the 1:1 ratio required in the classical scenario. This reduces the number of circuits between the CO and the hub, and drops the attendant costs. In addition, it reduces the need for CFA from an IXC for all inter-LATA circuits, which, historically has been the pacing item in bringing Internet service to market. UUNET's use of this architecture will improve time to market for services offered, reducing the opportunity cost associated with the delay between order entry and activation.

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## II. COBRA Technical Specification

### A. Design Summary

UUNET's COBRA architecture consists of the following four distinct components installed within the CO:

- ☐ Ascend MAX TNT (NAS)
- ☐ Ethernet hub (OOB management)
- ☐ Cisco 2511 (OOB management)
- ☐ Modem (OOB management)

The Ascend MAX TNT functions as the Network Access Server (NAS). Each TNT can terminate up to 12 ingress T1s (currently – DS3 termination for all 28 T1s is pending) which equates to 288 modems (although only 276 are used for ingress PRIs). Traffic is aggregated within the TNT and passed to the Internet via frame T1 circuits.

The Cisco 2511, the Ethernet hub, and the modem (which will require a POTS line from the local switch) permit initial and also emergency equipment management.

The modem and all of the TNTs are attached to the Cisco 2511 via async ports. In addition, each of the TNTs, as well as the Cisco 2511, are connected to the Ethernet hub. This architecture allows redundant out-of-band access to all of the TNTs once a dial-up connection to the 2511 has been established, either via the async connection to the console port of the TNT or over the local (non-routed) Ethernet management LAN.

### B. Basic COBRA Architecture

At the CO, Contractor PRIs are wired from the switch to the TNT. These PRIs are referred to as "ingress circuits." The TNT concentrates the traffic from the ingress circuits onto frame T1 circuits. These frame T1s are referred to as "egress circuits" or "backhauls".

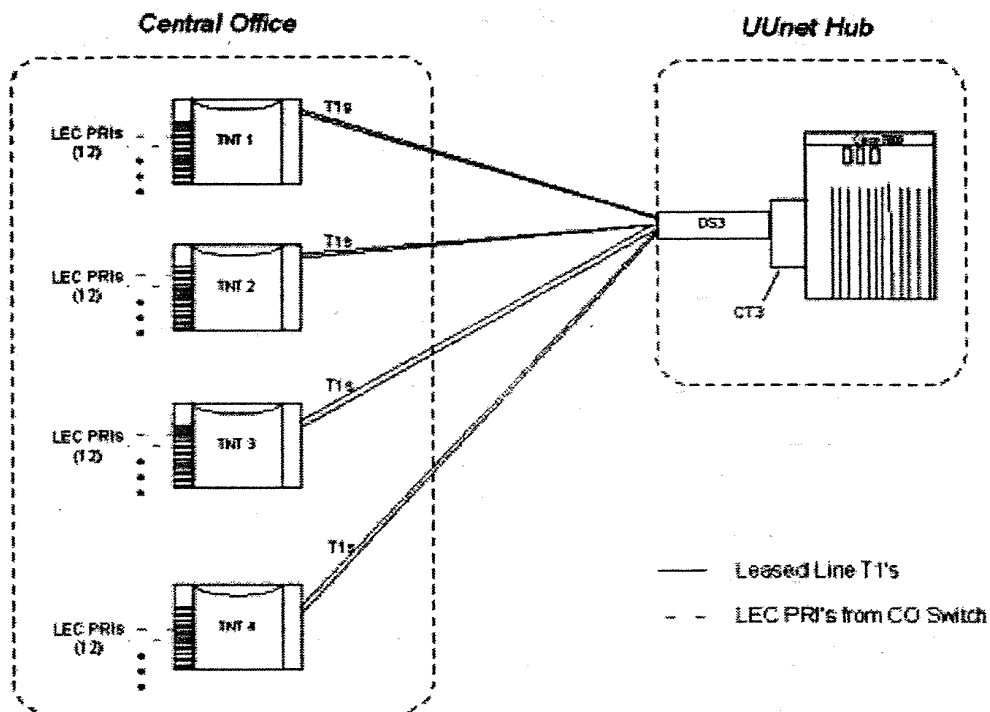
Egress circuits are provisioned at a ratio of 6 or less ingress circuits to 1 egress circuit. A "fully loaded" TNT has 12 ingress circuits and a *minimum* of 2 egress circuits. A TNT can support a maximum of 4 egress circuits, which provides room for expansion should the aggregation ratio metrics change moving forward.

The egress circuits are backhauled to the nearest suitable UUNET hub and terminated on a channelized entrance DS3. The DS3 is in turn terminated on a channelized T3 card in a Cisco 7000 series router.

All egress circuits connected to the same TNT must terminate into the same router. Different TNTs within the same CO may be terminated on different routers. These routers may be in the same hub or in different hubs.

CO-Based Remote AccessCOBRA Technical Specification

This basic architecture is illustrated in the following diagram:

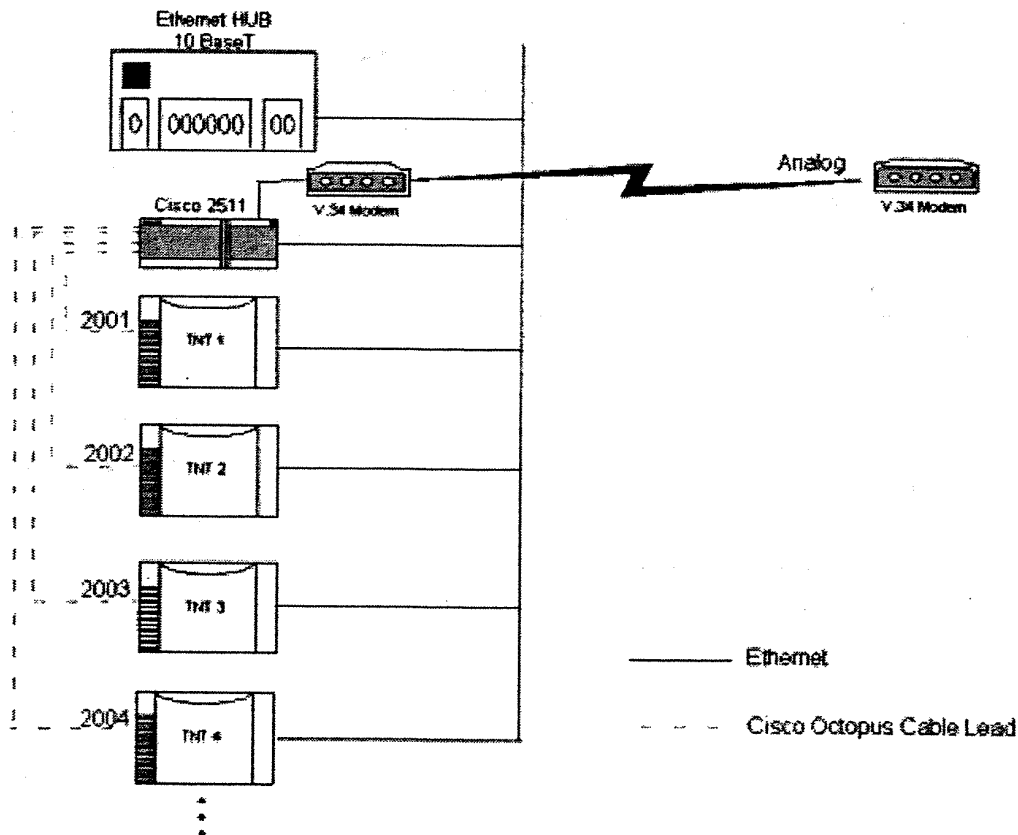


### C. COBRA Out Of Band Management Network

Initial and emergency management of the TNT will be done by UUNET via analog telephone line and modem. This is called out of band access (OOB).

Note that OOB access is not the preferred way to access the TNT because it is slower than IP. OOB access is used to initially configure the TNT and permit activation of the first backhaul circuit. After the first backhaul is activated, TNT configuration and code loading is done via IP through the backhaul itself.

The Cisco 2511 is functioning only as a local terminal server, and no routing functions are being performed. Similarly, the Ethernet hub is a local, closed network management LAN, and does not provide a path to any other equipment within the CO.



**D. TNT Specific Configuration**

Each TNT unit is called a shelf, which has 16 slots. The standard configuration consists of two 8-port T1 cards, an HDLC controller, and six modem cards, each having 48 56K KFLEX modems. The T1 cards have eight ports, numbered 0-7, and terminate either PRIs/Channelized T1s from the Contractor switch (ingress circuits), or hi-cap frame T1s going to the UUNET backbone (egress circuits). Our standard is to use ports 0-5 on each card for ingress and to use port 6 for egress. For each TNT shelf, we maintain an ingress to egress circuit ratio of 6:1 or less. A fully loaded shelf supports a total of 12 ingress circuits and 2 egress circuits. Port 7 of both T1 cards is not required, but it may be used for reserve capacity.

The 6:1 or less egress ratio has a distinct advantage. Assume that a COBRA installation has 18 ingress and 3 egress circuits. Any additional ingress T1s activated would require an additional egress circuit in order to maintain the 6:1 or less ratio. However, suppose that 2 additional ingress T's were activated, bringing the total to 20, and a fourth egress was activated to support it. There would then be room to activate an additional 4 ingress T1s upon receiving an order without requiring any activation other than the ingress T1s from the switch to the TNT, all of which is entirely within the Contractors control. This has proven to be quite effective in reducing opportunity cost associated with the delay between order and activation.

**E. Circuit Configuration**

All circuit configuration required at the NAS shall be the responsibility of UUNET. The parameters of circuit translation options required by UUNET are:

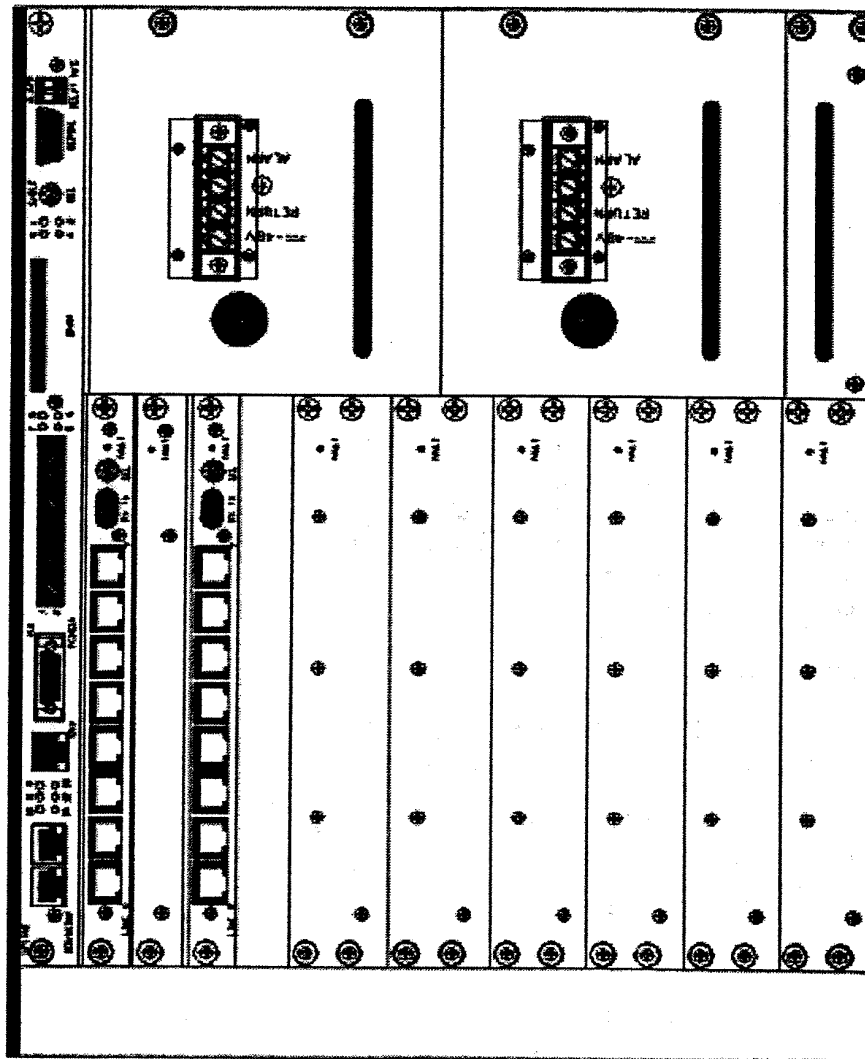
- ☐ Pricing is based on PRI only. If channelized T1s are provided on a short term basis prior to a PRI upgrade, UUNET shall be charged a reduced per port charge agreed upon on a case-by-case basis.
- ☐ NFAS
- ☐ B8ZS/ESF
- ☐ 10 DID numbers per rotary
- ☐ Forward circular sequential hunting. (If this functionality is available on the applicable switch it shall be activated)

**F. TNT Configuration**

The figure on the next page shows the back of a fully loaded DC-powered TNT. The card type and slot number is shown on the left. Note that the controller card at the top of the chassis is in slot 17. Subsequent cards start with slot number 1. Slot 4 is empty. The modems occupy two slots each. Each modem card has enough modems to service 2 PRIs.

COBRA Technical Specifications

Cable-based Remote Access



Slot 17 Controller Card

Slot 1 T1 Card

Slot 2 HDLC Card

Slot 3 T1 Card

Slot 5-6 56K Modem Card

Slot 7-8 56K Modem Card

Slot 9-10 56K Modem Card

Slot 11-12 56K Modem Card

Slot 13-14 56K Modem Card

Slot 15-16 56K Modem Card

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**G. TNT Equipment**

The minimum COBRA implementation that UUNET would deploy in any given site is 6 PRIs, with the right to augment that order by 2 PRIs at a time until the maximum capacity of 12 has been reached. The equipment required for a minimum configuration is outlined below.

<u>(QTY)</u>	<u>Ascend Part Number</u>	<u>Description</u>
(1)	TNT-DC	Chassis with 1 DC power
(1)	TNT-SP-DC	Second DC power
(1)	TNT-SL-HA192	HDLC Slot Card
(1)	TNT-SL-CT1	T1 Slot Card
(1)	TNT-SO-ISDN	ISDN software
(1)	TNT-SO-FR	Frame Relay Software
(1)	TNT-SP-DRAM-32	32MB DRAM
(3)	TNT-SL-48MOD-S56	48 Port slot card (Series 56 & V.34)

Contractor shall be responsible for the purchase, installation, support and maintenance of all this equipment.

### III. COBRA Service Description

This section serves to identify which party will be responsible for various components of this project. Many responsibilities have been identified previously within this document, but included here for clarity.

#### A. UUNET Management of the Dial Access Equipment

UUNET will be fully responsible for the management of the NAS, to include initial and ongoing configuration, software release levels and updates, and general "code control" of the NAS. UUNET will monitor and manage the NAS over the egress ports, with the out of band POTS line functioning as a backup. Contractor will have a "view" into the NAS for the sole purpose of performing services required by UUNET, but Contractor shall not have any right to any software or information installed on or available from the NAS or other equipment.

#### B. Contractor Management of the Dial Access Equipment

Contractor's responsibility for the management of the equipment is limited to the hardware aspects only. The Contractor will provide initial installation, hardware support and maintenance, and deployment of resources necessary to fix/replace hardware failures (once UUNET has contacted the Contractor and requested assistance). Should an alarm occur, UUNET will be responsible for contacting the Contractor's Network Operations Center (NOC). UUNET is responsible for determining the source/cause of the problem (Problem Identification) and resolving the problem (Problem Resolution). UUNET may or may not choose to take action on an alarm. If the alarm involves a hardware failure, UUNET will contact the Contractor's NOC, provide specific information on the location and type of activity to occur (example: replace module XXX in device YYY located at ZZZ location). The Contractor's NOC will then deploy the appropriate contracted resources to address the hardware problem.

#### C. Service Response

The service interval for Contractor's on-site response is to be determined by the criteria outlined below. A grade 1 problem is the most critical, grade 3 the least.

<u>GRADE</u>	<u>OUTAGE / PROBLEM</u>
1	T-1 outage between telephone switch and modem pool.
1	No response from maintenance ports on any associated equipment located in the Central Offices.
1	30% of the modems or more at any one site are not responding.
1	Any single point of failure piece of hardware outputting major alarms.
2	Less than 30% of the modems at any one site are not responding.

CO-Based Remote AccessService Description

- 2 Any single point of failure piece of hardware outputting minor alarms.
- 3 Any non service affecting problems on any associated equipment located in the Central Offices.
- 3 Requests for documentation.
- 3 Requests for call back on non service affecting issues.

GRADE CONTRACTOR RESPONSE TIME FRAMES

1	Mean time to respond	30 minutes
	Mean time to repair	4 hours
2	Mean time to respond	2 hours
	Mean time to repair	12 hours (Hardware is on-site)
	Mean time to repair	24 hours (Hardware must be ordered)
3	Mean time to respond	4 hours
	Mean time to repair	By end of next business day

**D. Reporting Requirements**

UUNET does not require any data or traffic reporting from the Contractor as part of this offering. UUNET does require an implementation schedule and service delivery dates, and shall set forth the applicable schedule and dates in each Work Order.

**E. Authentication**

User authentication will be the sole responsibility of UUNET.

**F. IP Address Space**

UUNET will provide IP addresses for the NAS from its assigned range. UUNET will retain ownership of such IP address at all times, including upon termination of Service or of the Agreement for any reason.

**G. Ingress Port "Overflow"**

The overflow of PRI from one hunt group to another will be standard within a single Central Office switch. If UUNET requires overflow of PRI from one Central Office switch to a different Central Office switch within the same local free calling area, then UUNET recognizes there may be a requirement to file a special assembly.

**CO-Based Remote Access****Service Description****H. End User UUNET Premise Equipment**

This service should be marketed and sold as Contractor's wholesale offering of services to UUNET. As a result, no end user CPE support from the Contractor needs to be offered as a part of this service.

**I. Billing**

UUNET will be billed for all Services described in this Section IV titled Service Description on a per port basis. Rate elements for this service will also contain a monthly recurring fee. This monthly recurring fee will contain the cost elements for ingress and egress port installations, upgrades, etc. There should be no non-recurring cost associated with service provided by Contractor. For instance, any installation or equipment maintenance costs realized by the Contractor should be incorporated into the monthly port fee and be transparent to UUNET.

**J. Circuit Activation**

Provisioning, test, and acceptance of the frame T1 circuits are UUNET's responsibility. Provisioning, test, and acceptance of the ingress PRIs will be the joint responsibility of UUNET, configuring the NAS side, and the Contractor, configuring the switch side.

**K. Minimum Commitment**

There is to be a minimum commitment of 64,000 ports pursuant to this Agreement. The tiered costing structure set forth below, providing decreased port costs for increased volume, shall be fixed for five years from the installation of the first port.

- (a) The monthly per Port recurring rate for the Service will be as listed below:

<u>Committed Number of Ports</u>	<u>Rate</u>
64,000 Minimum Quantity	\$54
64,001 – 120,000	\$53
120,001 – 160,000	\$52
160,001 – 200,000	\$51
200,001 – 250,000	\$50
250,001 – 300,000	\$49
300,001 and above	\$48

CO-Based Remote AccessService Description

- (b) UUNET will order and Contractor will provide a minimum of 64,000 Ports by May 15, 2000 ("Minimum Commitment"). Any Ports installed by Contractor resulting from UUNET's migration of existing PRI circuits to the Service shall count towards the Minimum Commitment. Contractor will not charge UUNET termination liability for such migrated PRIs.
- (c) Contractor will review Customer's orders on or after May 15, 2000. If as of May 15, 2000 UUNET has failed to meet its Minimum Commitment, Contractor will invoice a one-time penalty equal to 25% of the difference between the maximum number of Ports UUNET had in service at any time prior to May 15, 2000 and the Minimum Commitment multiplied by the applicable per Port rate multiplied by three (3) months. This penalty shall be Contractor's sole remedy and UUNET's sole liability for any failure to meet or maintain the Minimum Commitment.

**L. Circuit Orders**

UUNET will purchase egress Intra-LATA circuits required for the Services from Contractor pursuant to the then-applicable Contractor tariffs for such circuits. Notwithstanding anything to the contrary in any such tariff, (a) Contractor shall charge UUNET a flat rate price on these circuits not to exceed [\$\_\_\_\_] per T1 and [\$\_\_\_\_] per T3, and (b) in no event shall UUNET be liable for more than two month's circuit fees in the event any circuit ordered hereunder is cancelled or terminated. UUNET shall have no obligation to purchase Inter-LATA egress circuits from Contractor.

If at any time during the term of this Agreement Contractor offers Inter-LATA service by means of its own facilities UUNET's obligation to purchase egress Intra-LATA circuits shall immediately cease.

**EXHIBIT A-1****COBRA ARCHITECTURE WHITE PAPER – LUCENT/ASCEND EQUIPMENT****Introduction**

UUNET's Dial Access Division has invested time and money to develop CO-Based Remote Access (COBRA), a confidential and proprietary approach to building dial Internet infrastructure. UUNET requires the Services of Contractor in order to implement its approach and has entered into the Agreement herewith to obtain such Services.

UUNET's classical Internet dial access architecture consisted of PRI's which were backhauled into a NAS located in a UUNET hub, where the traffic was aggregated and routed onto UUNET's Internet backbone. Since the COBRA architecture moves the NAS out to the CO, the traffic is then aggregated at the CO. Realizing a 6:1 concentration ratio, COBRA requires only one egress T1 backhaul for each six ingress PRI's in the NAS, a significant departure from the 1:1 ratio required in the classical scenario. This reduces the number of circuits between the CO and the hub, and drops the attendant costs. In addition, it reduces the need for CFA from an IXC for all inter-LATA circuits, which, historically has been the pacing item in bringing Internet service to market. UUNET's use of this architecture will improve time to market for services offered, reducing the opportunity cost associated with the delay between order entry and activation.

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UUNET's COBRA architecture consists of the following four distinct components installed within the CO:

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The Ascend MAX TNT functions as the Network Access Server (NAS). Each TNT can terminate up to 12 ingress T1s (currently – DS3 termination for all 28 T1s is pending) which equates to 288 modems (although only 276 are used for ingress PRI's). Traffic is aggregated within the TNT and passed to the Internet via T1 circuits.

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***Basic COBRA Architecture***

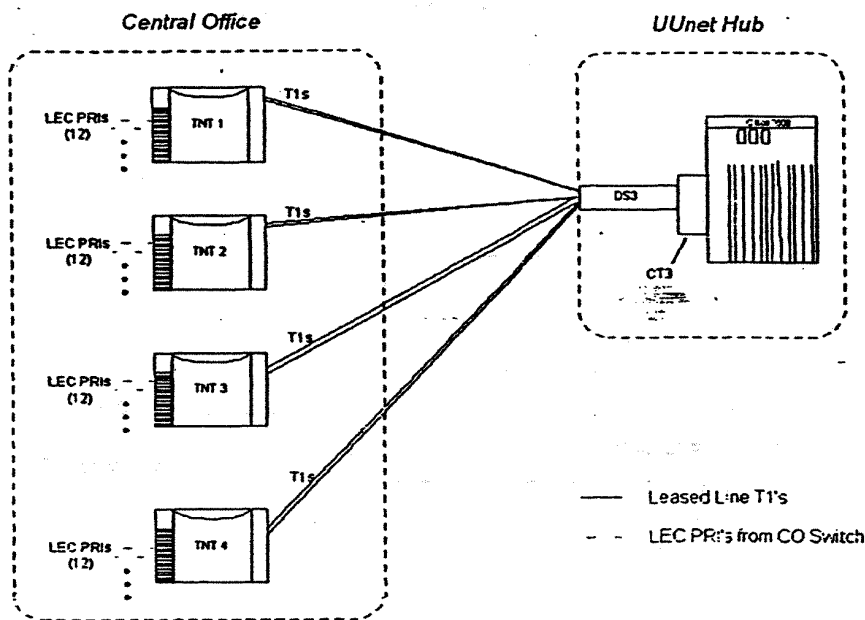
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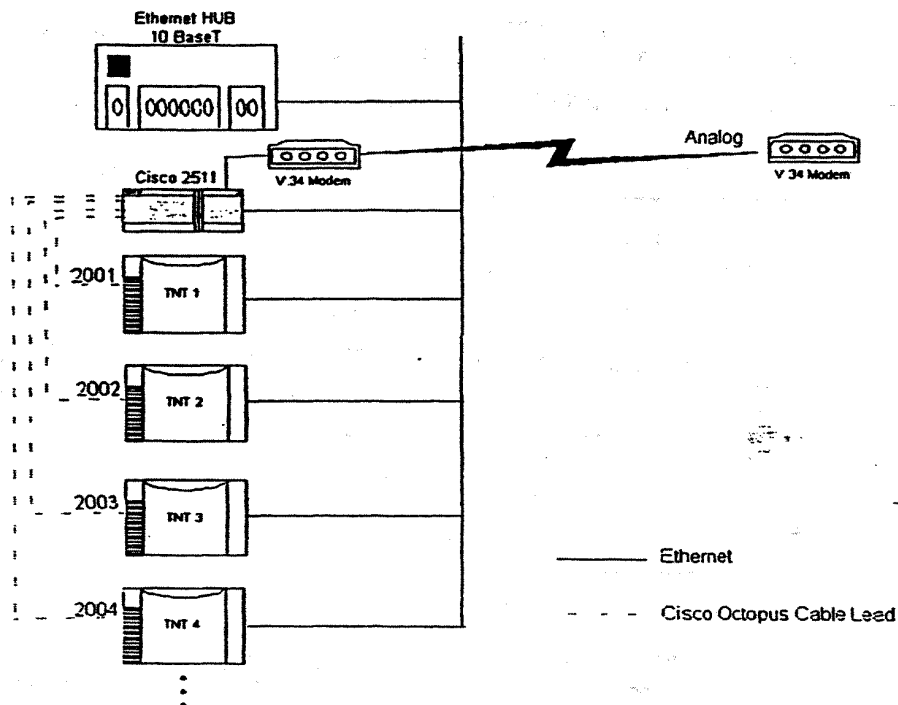


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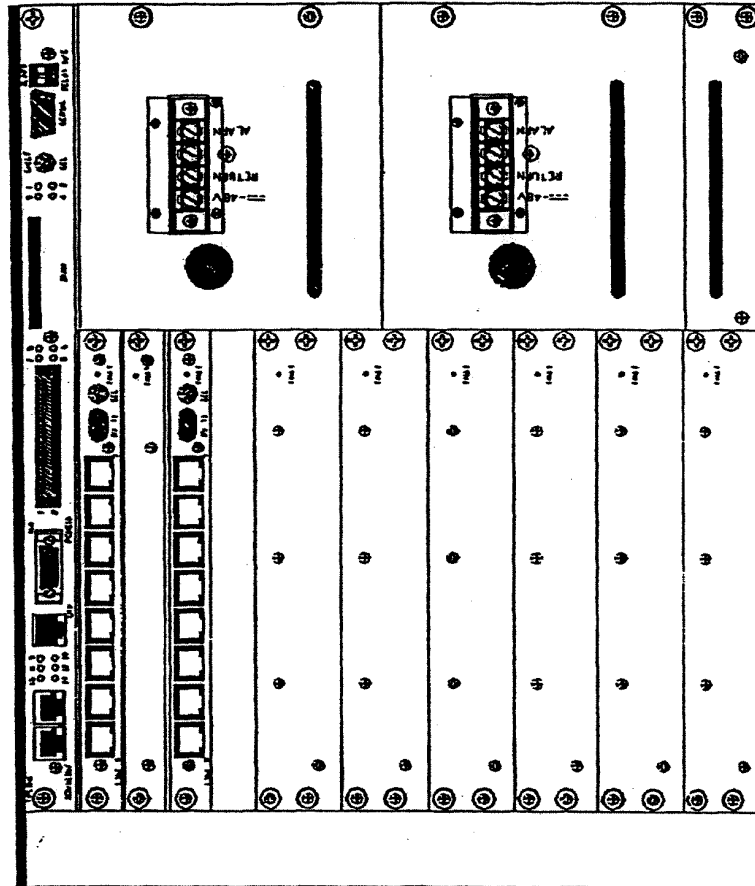
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- ☐ Pricing is based on PRI only. If channelized T1s are provided on a short term basis prior to a PRI upgrade, UUNET shall be charged a reduced per port charge agreed upon on a case-by-case basis.
- ☐ NFAS
- ☐ B8ZS/ESF
- ☐ 40 DID numbers per rotary
- ☐ Forward circular sequential hunting. (If this functionality is available on the applicable switch it shall be activated)

### **TNT Configuration**

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Slot 17 Controller Card

Slot 1 I1 Card

Slot 2 HULC Card

Slot 3 T1 Card

Slot 5-6 56K Modem Card

Slot 7-8 56K Modem Card

Slot 9-10 56K Modem Card

Slot 11-12 56K Modem Card

Slot 13-14 56K Modem Card

Slot 15-16 56K Modem Card

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SBC COBRA (final)

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**TNT Equipment**

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<u>(QTY)</u>	<u>Ascend Part Number</u>	<u>Description</u>
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(1)	TNT-SO-ISDN	ISDN software
(1)	TNT-SO-FR	FR Software
(1)	TNT-SP-DRAM-32	32MB DRAM
(3)	TNT-SL-48MOD-S56	48 Port slot card (Series 56 & V.34)

Contractor shall be responsible for the purchase, installation, support and maintenance of all this equipment.

**COBRA Service Description**

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**Contractor Management of the Dial Access Equipment**

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**Service Response**

The service interval for Contractor's on-site response is to be determined by the criteria outlined below. A grade 1 problem is the most critical, grade 3 the least.

<u>GRADE</u>	<u>OUTAGE / PROBLEM</u>
1	T-1 outage between telephone switch and modem pool.
1	No response from maintenance ports on any associated equipment located in the Central Offices.

- 1 30% of the modems or more at any one site are not responding.
- 1 Any single point of failure piece of hardware outputting major alarms.
- 2 Less than 30% of the modems at any one site are not responding.
- 2 Any single point of failure piece of hardware outputting minor alarms.
- 3 Any non service affecting problems on any associated equipment located in the Central Offices.
- 3 Requests for documentation.
- 3 Requests for call back on non service affecting issues.

<u>GRADE</u>	<u>CONTRACTOR RESPONSE TIME FRAMES</u>	
1	Mean time to respond	30 minutes
	Mean time to repair	4 hours
2	Mean time to respond	2 hours
	Mean time to repair	12 hours (Hardware is on-site)
	Mean time to repair	24 hours (Hardware must be ordered)
3	Mean time to respond	4 hours
	Mean time to repair	By end of next business day

#### ***Authentication***

User authentication will be the sole responsibility of UUNET.

#### ***IP Address Space***

UUNET will provide IP addresses for the NAS from its assigned range. UUNET will retain ownership of such IP address at all times, including upon termination of Service or of the Agreement for any reason.

#### ***Ingress Port "Overflow"***

The overflow of PRI from one hunt group to another will be standard within a single Central Office switch. If UUNET requires overflow of PRI from one Central Office switch to a different Central Office switch within the same local free calling area, then UUNET recognizes there may be a requirement to file a special assembly.

**EXHIBIT A-2****COBRA ARCHITECTURE WHITE PAPER - 3COM EQUIPMENT****Introduction**

UUNET's Dial Access Division has invested time and money to develop an alternative approach to building its dial infrastructure, and it requires a strategic alliance with the LECs (Local Exchange Carrier that offers local PSTN service) in order to be effected. It is a proven combination of architecture, equipment, and software, and is referred to at UUNET by the name CO-Based Remote Access (COBRA). This document provides an overview of COBRA from both technical and business viewpoints.

COBRA is an effort to push the Network Access Server (NAS) out to the LEC Central Offices (COs) while still providing UUNET with a dedicated platform. The NAS is LEC-owned and UUNET-managed. It is expected to be an integrated service offering wherein UUNET purchases modem ports instead of circuits from the LECs. Billing is based upon the total number of active ports, and the cost per port is determined by a tiered structure that includes the number of ports on order. This architecture would be applied to new service, service on order, and conversion of all existing active Dial Access service. UUNET typically commits to a multi-year term, which may be extended based on price discounts.

COBRA is a wholesale offering that will allow UUNET to obtain dedicated modem ports with one-way ISDN PRI on the ingress (incoming) side and UUNET-provided dedicated facility connections on the egress (outgoing) side. The equipment will be installed in the LEC Central Offices and will allow for connections that consist of:

- Analog Modem ports (up to 56K, supporting v.90 protocol)
- ISDN digital ports, single B-channel - 64K
- Point to Point DS1, Point to Point DS3 egress

The LEC will provide the network access servers (NAS) within those Central Offices agreed upon by UUNET and the LEC. Additional Network Access Servers will be deployed in other central offices if agreed upon by the LEC and UUNET at a later date.

Although different vendors' NAS products are continuously evaluated by UUNET, this document will address the 3Com Total Control Modem Chassis. The 3Com Equipment will be purchased from UUNET (acting as a reseller), and allow the LECs to benefit from UUNET's unique relationship with 3Com through the discount rates UUNET offers. The Total Control units are installed by the LECs in their COs, and all hardware maintenance is the responsibility of the LEC. Operational aspects of the hardware are controlled by UUNET, including configuration management, user authentication, trouble identification, and Internet backbone connectivity. This allows both the LEC and UUNET to focus on their core competencies: the LEC managing circuits and equipment, and UUNET managing configurations, modem code updates, IP address space, session records, and other Internet related responsibilities.

In the current environment of vastly changing telecom reform, UUNET is faced with new alternatives that require a re-evaluation of strategic direction and partnering. UUNET looks forward to working together with the LECs to create a win-win solution that makes it so desirable to do business that there would be no need to look elsewhere for service.

**3Com COBRA Design Benefits****Partner's Leverage of Core Competencies**

UUNET has years of knowledge, skills, and experience in the Internet - from deployment to customer demands to usage patterns to modem anomalies to routing. LECs excel at providing circuits and deploying the required support infrastructure. COBRA allows each of the partners in this relationship to focus on their respective core competencies, leveraging their individual expertise such that the whole will be greater than the sum of its parts.

**Improved Time to Market**

The LEC will benefit from an improved time to market in the form of a reduction of the opportunity cost associated with the delay between circuit order and activation. The time to market will decrease for a number of reasons. UUNET will not have to locate a suitable collocation site and arrange for possible modifications to the heating, air conditioning, and electrical facilities and the LEC will not have to plan and construct outside plant to supply the required circuits at our new remote location. Thus, the turn around time between circuit order and activation is limited to how quickly the LEC can cross connect the required number of circuits.

Not only is an improved time to market desired by and a realized benefit to the LEC, but it is to UUNET as well. When a given rotary becomes blocked (i.e., users dial in but get a busy signal because there are no modem ports left), UUNET seeks to augment the loaded rotary with additional capacity as soon as possible. Although every effort is made to predict when blockage will occur and order additional capacity ahead of time, UUNET still encounters blocked POPs. There is an opportunity cost to UUNET for every rotary that is blocked because users are trying to dial up and generate connect time revenue. An improved time to market is clearly one of the most significant advantages to COBRA that benefit both UUNET and the LEC.

**Extended Coverage into New markets**

UUNET's classic architecture limited the number of rotaries UUNET would access because of the cost of deploying circuits from remote COs back to UUNET hubs. COBRA will allow UUNET to branch out and provide dial access service into the more geographically remote areas that had been previously cost prohibitive. This has the potential for UUNET to realize 100% coverage within the LEC region.

**Relief of Interoffice Trunking**

Migration of the NAS to the CO allows for the opportunity to relieve congested interoffice facilities. Every CO is now a candidate for NAS equipment, and they can be deployed into the COs where the traffic emanates, reducing the need for tandem aggregation.

**LEC's CO Space Integrity**

Because of the unique business arrangement and architecture of COBRA, the LEC can maintain the integrity of the CO while generating revenue from currently vacant floor space.

**Strategic Long Term Relationship**

Availability of the product offering that UUNET proposes at the appropriate cost per port would encourage UUNET to choose the incumbent LEC as the preferred provider within a given region. A competitive port cost from the LEC will reduce the need for UUNET to evaluate the various CLEC (Competitive LEC) alternatives. UUNET's COBRA solution provides an increased ease of doing business that scales well, and permits UUNET to develop a strategic long term relationship with key partners. UUNET seeks mature and stable business partners with wide geographic coverage that allow them to gain the greatest coverage with minimal points of contact and focus on a region-wide strategic direction. Implementation of this business proposal would make clear the strategic direction for UUNET within the LEC territory.

**3Com COBRA Functionality**

The 3Com COBRA architecture supports specific functionality and draws on a unique relationship with the NAS vendor. This functionality has evolved over time and is vital to our ability to provide highly reliable Internet service. This section of the document highlights certain specific features that are fundamental requirements of UUNET, and should be seriously considered prior to the suggestion of any deviation of the product offering described. It has been UUNET's experience that most LECs already have some type of modem port offering, and generally prefer to use that offering to meet UUNET's needs. While those product offerings clearly have potential for sale into specific target customer bases, such as small, local ISP's, none meet the special requests and unique requirements of UUNET unless they conform exactly to the specifications outlined herein.

**Integrated Equipment Cabinet**

The 3Com COBRA equipment is delivered to the LEC facility as a complete assembly housed in a standard 24"W x 36"D x 72"H cabinet. This insures all necessary components are properly arranged and cabled. The LEC will place the cabinet, plug in the power cords, and connect the circuits to pre-wired patch panels.

**Access Types**

UUNET end-users will be able to access the COBRA service via analog modem or ISDN on the ingress (incoming) port side. The equipment will then aggregate the traffic and provide an egress (or outgoing) port connection to one of the following egress circuits:

- Point-to-Point DS1
- Point-to-Point DS3

These egress circuits will be required to deliver the dial access traffic to UUNET's chosen location. UUNET will be responsible for providing the egress circuit(s) connecting the dial access site to the UUNET hub location. The circuit(s) can be ordered from the LEC or another carrier. UUNET will determine the type of egress port to be deployed.

**Billing and Statistics Support**

This will be managed by UUNET via remote access to the NAS.

**Verification-Termination Server Support**

This will be managed by UUNET via remote access to the NAS.

**Modem Hot Swaps**

The 3Com modem cards are hot swappable. This makes physical maintenance to a NAS less time-consuming since the NAS does not require a re-boot in order to replace a modem card.

**3Com COBRA Technical Specifications****Design Summary**

The 3Com Total Control Modem Chassis functions as the NAS. One modem chassis can support up to fourteen (14) HiPerDSP cards with each HiPerDSP card being able to support one T1 PRI. Each physical cabinet can support four (4) modem chassis with a total of 56 HiPerDSPs per cabinet or 1344 modems (1288 usable ports). Dial traffic is passed to the 3Com ethernet switch that is directly connected to the egress aggregator. (See diagram at end of document.)

The 3Com Total Control management chassis is used for authentication, data collection and management of the dial equipment in the cabinet. The management chassis has an analog modem card for Out-of-band (OOB) access that is used during the initial configuration of the equipment and for troubleshooting if access is not available via the egress circuit(s).

The Cisco 7204 is used for the termination of the egress T1 or DS3 circuit(s).

**Basic COBRA Architecture**

At the CO, the LEC PRI circuits are wired from the switch to the pre-installed mod-tap panels in the modem cabinet. These PRIs are referred to as "ingress circuits". The 3Com equipment concentrates the traffic from the ingress circuits onto the clear channel T1s or single T3 via the egress aggregator. These are called the "egress circuits" or "backhauls".



**COBRA Out-of-Band Management Network**

Initial configuration and emergency maintenance of the 3Com and Cisco equipment is performed by UUNET via analog telephone line and modem. This is called out-of-band access (OOB). As part of the COBRA service, the LEC will provide a dedicated analog phone line for each OOB modem installed in a given CO.

Note that OOB access is not the preferred way to access the equipment because it is slower than IP. OOB access is used initially to configure the equipment and permit activation of the first backhaul circuit. After the first backhaul is activated, equipment configuration and code downloading is done via IP through the backhaul.

**Circuit Configuration**

All circuit configurations required at the NAS are the sole responsibility of UUNET. The parameters of circuit translation options required by UUNET are:

- PRI
- NFAS
- B8ZS/ESF
- 40 DID numbers per rotary
- Ascending hunt sequence

**3Com Total Control Specific Configuration**

Each Total Control unit is called a chassis. There are five (5) chassis installed in each physical cabinet. Four (4) of the chassis are dedicated to housing modems with each of the chassis being able to support up to fourteen (14) HiPerDSP cards. Each HiPerDSP card terminates one (1) T1 PRI.

The fifth chassis in the cabinet is dedicated to housing cards required to manage the equipment in the cabinet. The management chassis is responsible for data collection, authentication, domain name service and out-of-band management to all of the equipment in the cabinet. Within the management chassis is a 3Com EdgeServer card. This card contains UUNET proprietary software. In the event the EdgeServer needs to be replaced, UUNET will need to re-install this proprietary software. Remote hands & eyes assistance may be required from a LEC technician.

**Equipment Requirements**

The 3Com architecture for the LEC COBRA cabinets are outlined below:

3Com Total Control Modem Chassis (maximum of four (4) per cabinet/336 ports per chassis)

Qty	Part #	Description
1	3COM-613613	TCH Dual 130A/AC Power with HiPerNMC
1	USR-80-613609	HiPerARC Card Set (Ethernet)
14	USR-80-002092	HiPerDSP Card Set (24 ports per card)

Total Control Management Chassis (one (1) required per cabinet)

Qty	Part #	Description
1	3COM-613664	TCH Dual 70A/AC Power with HiPerNMC
1	USR-80-613608	EdgeServer Pro
1	USR-80-613610	Quad Analog Digital Modem Card Set

**Peripherals**

Qty	Part #	Description
1	3C169-80	3Com SuperStack Ethernet Switch (UUNET owned)



1	N/A	Cisco Egress Aggregator (UUNET owned)
4	ANX-27.1B.241.B002G	Mod-Tap Patch Panels
1	ANX-148646RJ-45	Feed-thru Patch Panel
1	DSX3-P4	DSX3 Panel
1	SPE-P4Cables-Base	Phase 4 Cable Kit
1	NOR-CC-NT3-842436-19BG	7' Data Cabinet

The Cisco 7204 egress aggregator and 3Com ethernet switch (both owned by UUNET) will reside in the physical cabinet with the modems.

### 3Com COBRA Service Description

The following service features will be included with COBRA or as options that may be offered.

### UUNET Management of Dial Access

UUNET will be responsible for the management of the NAS for this service. The "UUNET Management of dial access" implies that UUNET will have full responsibility for initial and ongoing configuration, software release levels and updates, and general "code control" of the NAS. The monitoring/management/ reporting activities performed by UUNET will occur over the egress port link(s) into the NAS or through a backup dial-in channel that the LEC will provide for each site. The LEC will not have a "view" into the NAS. However, the LEC will provide hardware, remote hands and eyes, and Central Office switching maintenance and deployment of resources.

With the COBRA service, UUNET is responsible for providing configuration and management of the equipment in the cabinet.

The physical demarcation point for the equipment is the end of the ethernet cable from the 3Com SuperStack Switch that connects to the fast ethernet card in the egress aggregator.

### Alarm Management

Should an alarm occur, UUNET will contact the LEC to report the alarm and request maintenance support if it is required. UUNET may or may not choose to take action on this alarm.

### Problem Identification

Problem Identification will be carried out by UUNET through either the primary or backup management interfaces and will isolate the problem to one of three sources:

- the egress circuits between the NAS and the UUNET location,
- the NAS itself, or
- the PRI or other ingress trunks connecting the NAS to the PSTN.

At each site, a TPI 970 (or equivalent) PRI test set will be maintained by the LEC to aid in the resolution of glare situations in which it cannot be determined with certainty that the NAS is operational.

### Problem Resolution

Since the egress circuits are UUNET-provided, if UUNET's Problem Identification activities determine that the trouble lies in the egress circuits, a trouble report will be issued with the provider of those circuits.

The LEC will provide hardware support and maintenance, and deployment of resources necessary to fix/replace hardware failures (once UUNET has contacted the LEC and requested assistance). Should an alarm occur that involves a hardware failure, UUNET will be responsible for contacting the LEC's Network Operations Center (NOC), provide specific information on the location and type of activity to occur (example: replace module XXX in device YYY located at ZZZ location), and the LEC will then immediately deploy the appropriate resources to address the hardware problem.

Upon request of UUNET and under the direction of UUNET staff, the LEC will provide support services which include but are not limited to the following.

- 1) Power cycle equipment
- 2) Visual inspection of equipment
- 3) Adjustment of dip switches on cards
- 4) Physical reseal of cards and cables
- 5) Replacement of old cards with new
- 6) Miscellaneous tasks with a duration of less than 15 minutes.

#### Equipment Sparing

The LEC will be responsible for sparing at each COBRA site, and replacement of the following equipment:

- 3Com Total Control chassis and components in chassis
- 3Com SuperStack Ethernet Switch
- Cabling within the cabinet
- Mod-Tap and Feed-thru patch panels

#### Service Response

The service interval for the LEC's response is to be determined by the criteria outlined below. A grade 1 problem is the most critical, grade 3 the least.

<u>GRADE</u>	<u>OUTAGE / PROBLEM</u>
1	T-1 outage between telephone switch and modem pool.
1	No response from maintenance ports on any associated equipment located in the Central Offices.
1	30% of the modems or more at any one site are not responding.
1	Any single point of failure piece of hardware outputting major alarms.
2	Less than 30% of the modems at any one site are not responding.
2	Any single point of failure piece of hardware outputting minor alarms.
3	Any non-service affecting problems on any associated equipment located in the Central Offices.
3	Requests for documentation.
3	Requests for call back on non service affecting issues.

<u>GRADE</u>	<u>CONTRACTOR RESPONSE TIME FRAMES</u>
1	Mean time to respond 30 minutes Mean time to repair 2 hours for Tier 1 (High- Density) cities Mean time to repair 4 hours for Tier 2 (Low-Density) cities
2	Mean time to respond 2 hours Mean time to repair 4 hours (Hardware is on-site) Mean time to repair 24 hours (Hardware must be ordered)

- 3      Mean time to respond 4 hours  
         Mean time to repair by end of next business day \*

\* Maintenance that will impact customers using the UUNET equipment must be scheduled during maintenance periods; generally between 4 a.m. and 7 a.m.

Response time is defined as the timeframe for a LEC technician to provide acknowledgment of receipt of a trouble report from a UUNET Network Operations Center technician.

#### **Circuit Activation**

Provisioning, test, and acceptance of the egress circuits are UUNET's responsibility, unless such egress circuits are ordered by UUNET from the LEC. Provisioning, test, and acceptance of the ingress PRI/DSS will be the joint responsibility of UUNET, configuring the 3Com equipment, and the LEC, configuring the switch side.

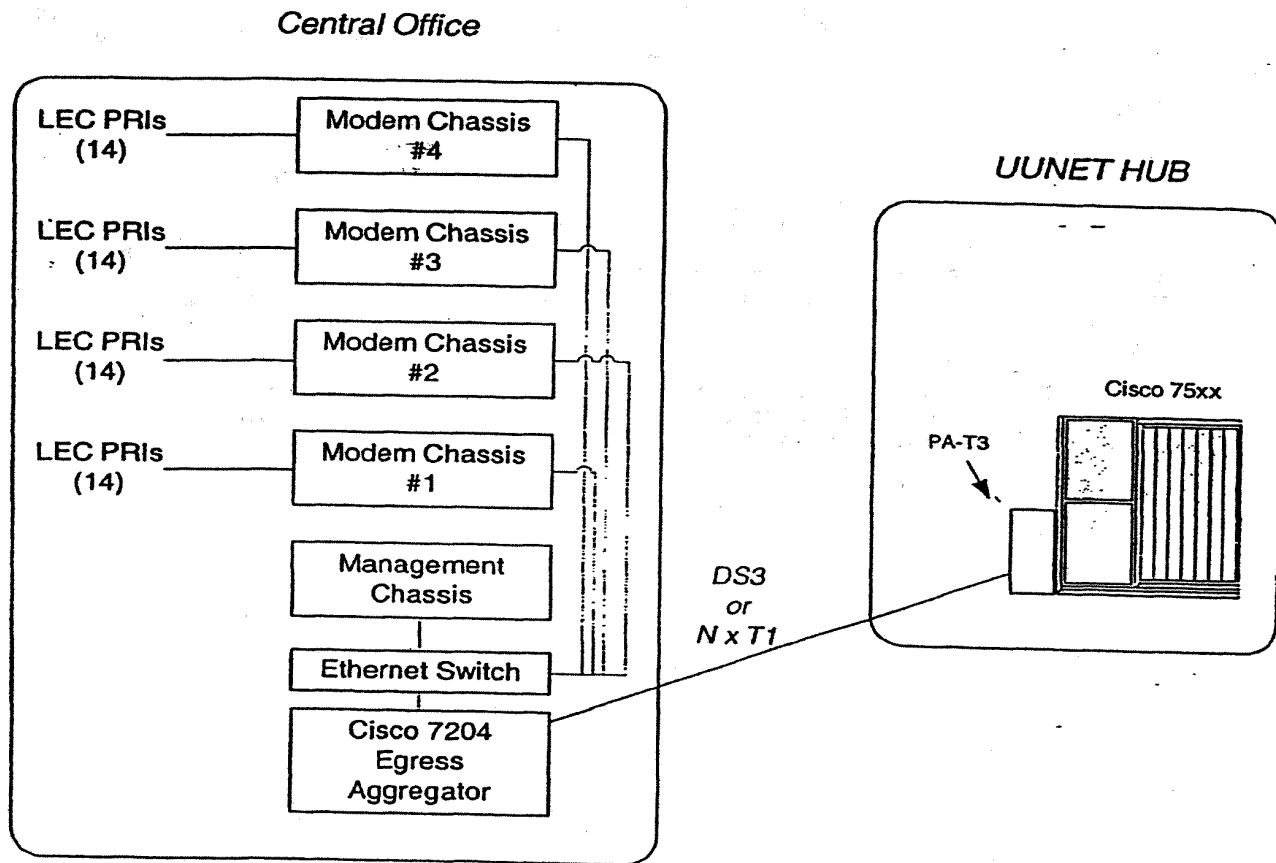
#### **Remedies**

Each Calendar quarter the parties will conduct an Operations Review at which the LEC will present analysis on its performance, including but not limited to the metrics set forth herein. If in a given calendar month the LEC has failed to meet the Mean Time to Respond or Mean Time to Repair for all Grade 1 and Grade 2 problems (based on the average of the top ninety percent of all Grade 1 and Grade 2 trouble tickets opened that month), both parties mutually agree to the following action plan: 1) Within 7 days of review, both parties will meet to determine deficiencies and develop mutually acceptable remedies and timeline to improve service levels, 2) Escalation to the LEC executive level, and 3) Parties will negotiate mutually agreed upon monetary settlement for service outages on an Individual Case Basis.

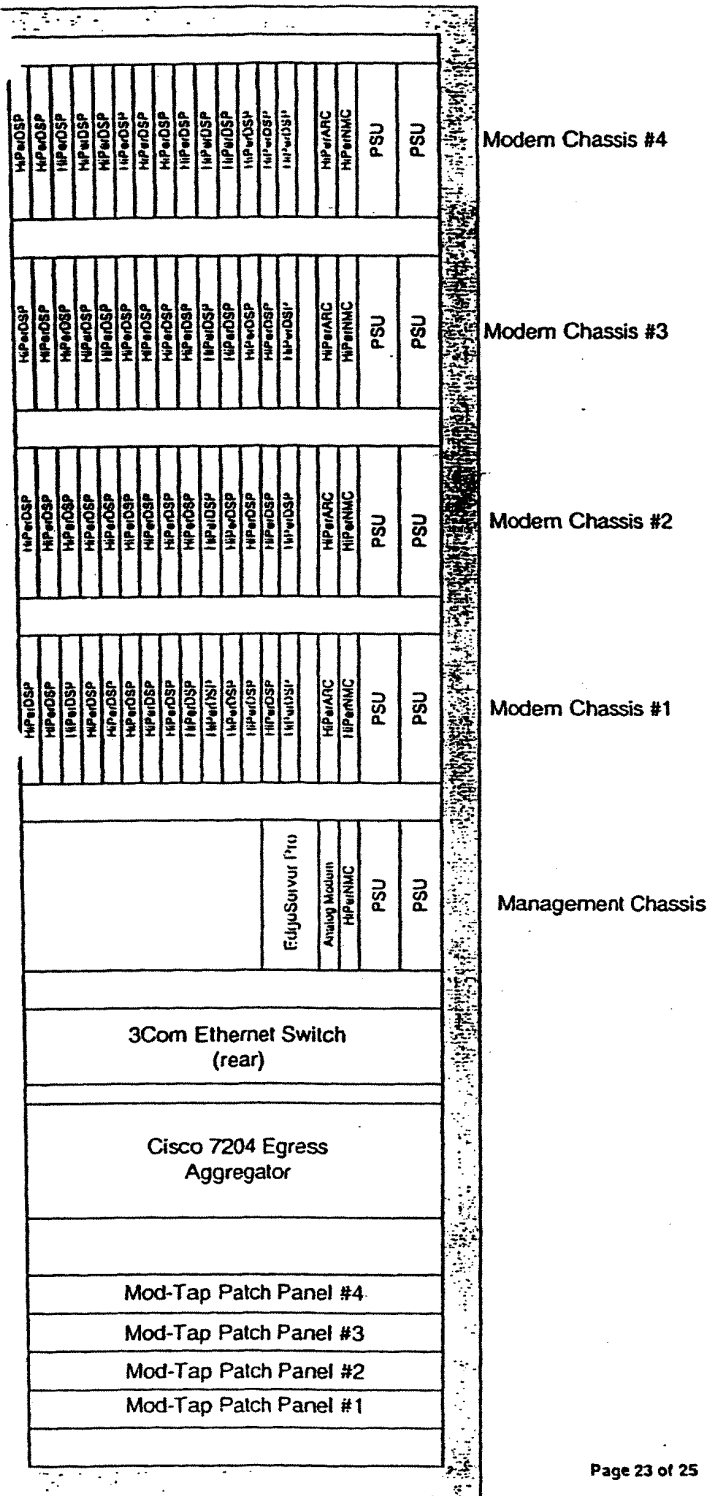
#### **Site Manual**

A detailed Site Manual, including Central Office floor plans, bay placement, bay configuration, cabling schematics, PRI configuration, DSX cross connects, and contact procedures will be provided as part of the service. Alternatively, the LEC may choose to provide secure HTML access to this information via the World Wide Web.

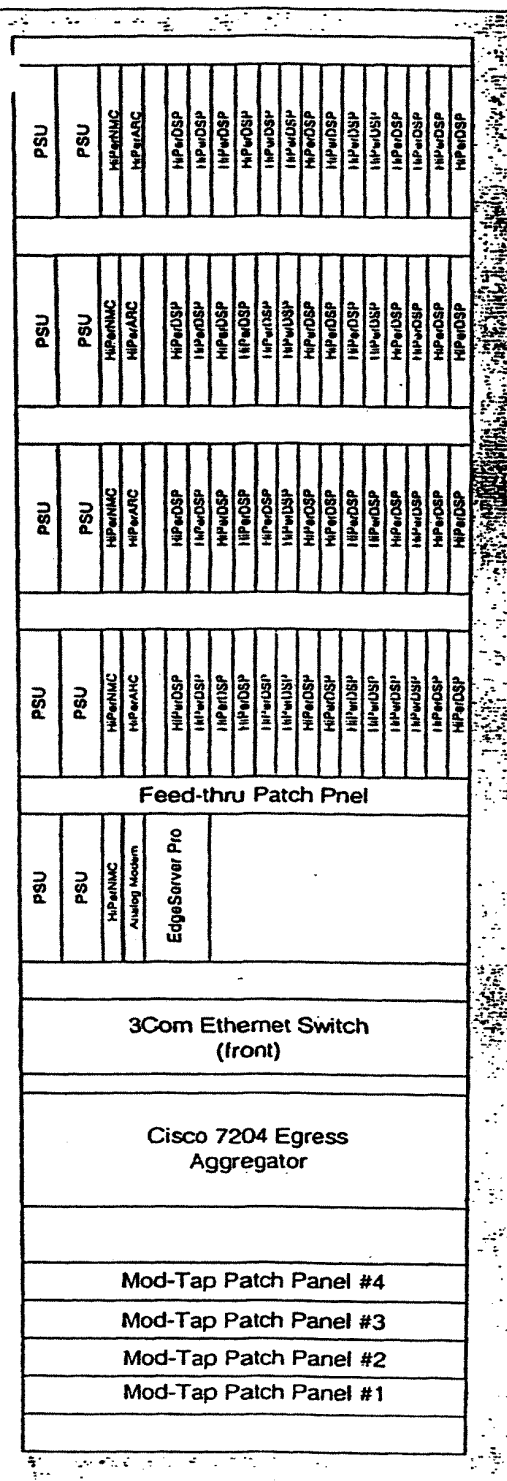
## Ingress/Egress for Fixed Port Network



**UUNET COBRA  
CABINET  
(using 3Com Equipment)**



**REAR VIEW**



**UUNET COBRA  
CABINET  
(using 3Com Equipment)**

### Modern Chassis #4

### Modern Chassis #3

## Modern Chassis #2

### Modern Chassis #1

## Management Chassis

**(Note: front of the ethernet switch is facing the rear of the cabinet.)**

**(Note: Mod-Tap patch panels are installed on rear rails with RJ45 connectors facing the front of the cabinet with punch downs facing rear of cabinet for each access by the LEC provider)**

### **3Com Cabinet Specifications**

**Cabinet Size:** 24" wide x 36" deep x 84" high, plus room to open 24" access doors front and back.  
**Weight:**  
Second and Third Generation: 800 lbs. (no UPS installed)  
Phase IV (now being installed): 750 lbs. (no UPS)  
Footprint should be 3' deep X 2' wide for each cabinet and accommodate a height of 7 feet.  
Requires 24" access front and rear doors to open 24" with no obstacles.

**Electrical:** Requires two (2) twenty-amp (20) 120 volt single phase 3.1 KVA plugs, with (2) L5-20R receptacles per cabinet. Plug locations under raised floor or directly accessible within 6 inches of cabinet if slab floor. They should be no more than 6 inches from the cabinet and no higher than 4 inches from the floor. Raised floor cutout must be 1 foot X 1 foot in dimension.

**Flooring:** Raised computer floor preferred provided under-floor ventilation is present, otherwise slab floor is acceptable. First floor location preferable.  
Floor loading requirements are 100 lbs. per square foot.

**Telephone:** Each cabinet may have a maximum of sixty-two (62) DS1 circuits and one (1) POTS line.

**Environmental:** Room temperatures maintained between 55-75 degrees F. is required. Each cabinet generates 12,000 BTUs per hour.  
  
Facility must provide a virtually dust-dirt free environment for cabinet location. Cabinets should not be placed within 2 feet of any heating or air conditioning vents and or ducts or located in the proximity of automated sprinkler heads.

**Grounding:** Cabinet must be grounded at facility. Any facility with a grounding ring must ground cabinet to facility grounding ring.